COMMERCE AND ENGINNEERING

The Value of Commercial Subjects to the Engineer

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THE art of Engineering has well been defined as, "The process by which, through scientific principles, force and materials of nature are made useful." Engineering is a profession so old that it has never been traced to its beginnings. However, if we will for a moment enumerate some of the extraordinary monuments to the genius of engineering, from the construction of the Grand Canal of China, built thirty centuries ago, to the building of the railroad under the Hudson River into New York, we will find that forces and materials of nature were made useful for the benefit of mankind. The mere enumeration of these show that there are greater engineering problems still to be solved. These tasks belong to the engineer of the future, to those who are now entering the engineering profession.

While the engineers of today are finding more economical uses for the forces and materials of nature, the engineer of tomorrow will not only have to conserve our natural and industrial resources, but conserve human labor as well. The future engineer will have thousands of economic problems unknown to the engineer of today, and consequently he must be educated to meet these new problems.

Technical training is no longer the only essential of the engineer's education. Fifty years ago the university graduate with a degree in engineering was often looked down upon by those in charge of engineering operations. His education was believed to be largely theoretical and minus the hard knocks that come to a man whose knowledge is gained from work in the field. Today at attitude toward the university educated engineer is very different. In every department the demand is for men with a technical course behind them. The engineers of tomorrow will need to be trained as broadly, as men in other professions, and the aim in this broader training is identical with the aim in all professional education. Business is rapidly becoming engineering and engineering becoming business. The future engineer must be a business man as well as a nengineer.

The engineer of tomorrow, as the engineer to today, will be called upon to take part in great enterprises and in the organization and operation of great public utilities. Engineers have been criticized in the past because the tendency to specialize has stood in the way of their general culture, and they have emerged from their technical course letter perfect in their specialty, but lacking in educational balance. This one-sidedness has shown itself in an inability to express themselves properly, ignorance of other subjects than their own, inability to be at ease and congenial with other professional men.

The engineer must be educated as well as trained. Statistics show that about 50% of the engineering graduates are holding executive positions. You, the engineer of tomorrow, must have a broad training, which will fit you for these opportunities. How shall we acquire this broad training that will be a necessary or even a vital part of the engineer's makeup? Should the engineer's curricula be expanded to include such subjects as Sociology, in its bearing on problems of labor, conditions of the working man, social hygiene; Philosophhy, for its practice in thinking, including of course, logic and psychology; Government, especially the studies which concern public utilities, control of corporations, etc.; Economics, especially the branches of the subject connected with finance, markets, industrial management, commerce, foreign trade, foreign exchange, imports, exports, tariff duties and customs? These subjects are all extremely important. To include these subjects, the engineer would have to spend at least five years in college. Many men cannot spend the time and money to do this. To include these subjects in our present four year curricula would mean a sacrifice to some of our technical subjects, and at present the engineers' schedules are condensed to include only the most vital subjects of the respective branches of engineering.

The advantages of commercial subjects to the engineer can be readily appreciated, however, the method in which the engineer is to acquire these subjects, is one which is in general discussion today. The advantages are more prevalent in the different branches of engineering. The civil engineer has to deal largely with the public utilities, city and state governments. When a city is laid out the first man sent for is the engineer. He is called upon to lay it out, and then plan all the parts necessary to make it habitable. He is called upon to submit plans and specifications for the building of highways, bridges, acqueducts, irrigation systems, etc., to the city council or state and federal governments. Somewhat like a lawyer, he must plead his case before men, who are primarily interested in the welfare of the community, men who are non-technical, and perhaps a little too economical, and lacking the vision and forethought that is so characteristic of the engineer. Thus he must sell his ideas, his services, and his plans, which are truly technical, in a non-technical way. His technical knowledge is his stock in trade (or the tool), and his commercial knowledge the means of his success in business.

Likewise the value of commercial education is equally, if not more, important to the electrical engineer than to perhaps any of the other branches of the art. The territory covered by the electrical engineer is unlimited. Practically every city, town and hamlet has in its employ electrical engineers. Electrical apparatus is being sent into even the remote corners of the world in an effort to utilize the natural resources and to help conserve human labor as well. Not unlike the civil engineer, the electrical engineer deals also with the municipal and state governments. A great majority of the electrical engineers enter the sales engineering field. They are daily transacting business with non-technical men. A greater part of the revenue received by our large electrical manufacturing companies is not from the large power and railway equipment sales, but from the appliances, accessories, transmission line equipment and in general, electrical supply apparatus, which is sold over the counter by electrical sales agencies and department stores throughout the world. The magnitude of this phase of the business can hardly be realized. The electrical engineer therefore who expects to enter the sales engineering field will certainly find it to his advantage to take as many of the commercial subjects as he can while in college.

Probably the most important of the commercial subjects to the engineer, and which has not been listed above,

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is Public Speaking. English is an integral part of the engineer's training, and of course needs no further mention here. There is no worker you can think of who needs no ability to speak well. Perhaps you will say a lighthouse keeper, all alone at his post. But in securing his job and reporting on it, and in telephoning or talking to occasional visitors who come to him on matters of business, he will need to speak distinctly and accurately. Who is there who does not need to be able to give a clear explanation of some process? The world of occupations is full of occasions requiring explanations, descriptions, arguments, interviews, conversations, business meetings, conferences, and all the other situations requiring speaking. The engineer especially often encounters unexpected and important situations where effective speech is required of them. A civil or electrical engineer may know perfectly well that this factory should build a new power plant, but how shall he convince the board of directors when he is called before them for his statement? Again, the ability to read a paper is necessary. The engineer in reading his report or paper on a certain project, must stand before his fellows and accurately and clearly give them the substance of the paper.

At this point the reader may open a discussion, as to what commercial education did some of our outstanding engineers have while in college. In review we can say that such men as General Goethals, John Hayes Hammond, and the late Benj. W. Lamme and Charles P. Steinmetz, did not take advantage, or they did not have an opportunity to take the commercial subjects along with their technical course. However, in studying their rise to success in industry, we find that these men entered the strictly technical field and worked in this field for perhaps ten years or more, until they had become firmly established in their respective technical lines of work, and then they began to gradually acquire the commercial subjects that they needed to broaden their field of endeavor. While it may not seem advisable to load up the engineer with commercial subjects that he will not use for ten years hence, it will give him that broadening-out effect, and additional business ability with which to start his career, and at the same time have this knowledge when he is called upon to use it.

Each week the engineers have a one or two hour lecture program, which is advertised as, "Broaden-Out Engineers," in which noted speakers, from the different professions talk on their respective lines of work. It is well worth the time and energy for all engineers to frequent these lectures. It is well to remember that general information is extremely valuable to the engineer. Spare time spent in reading,—books, magazine articles, newspapers, no matter what the subject,—is seldom wasted. If he can get away from his own province in this reading so much the better. He should never pass an opportunity to add to his store of facts. Knowledge apparently useless may become valuable under different circumstances.